

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Chengua "Oliver" Han	§ Group Art Unit:	3641
		§	
		§	
Serial No.:	10/027,727	§ Conf. No.:	9783
		§	
Filed:	December 21, 2001	§ Examiner:	Stephen Johnson
		§	
For:	SHAPED CHARGE	§ Atty. Dkt. No.:	22.1450
		§	SHL.0227US

Technology Center Director  
Mail Stop PETITIONS  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

PETITION UNDER 37 CFR 1.81(a) FOR A CORRECTED EXAMINER'S ANSWER  
DESIGNATING NEW GROUNDS OF REJECTION

Dear Sir:

Pursuant to 37 CFR § 1.81(a), Applicant hereby petitions for the Examiner's Answer mailed on May 7, 2010 (herein called "the Examiner's Answer" and attached as Exhibit A), to be withdrawn and a subsequent corrected Examiner's Answer be mailed out, which designates the new grounds of rejection, which are set forth in the Examiner's Answer.

The facts in support of this petition are as follows.

1. The Examiner mailed out a Final Office Action on October 13, 2009 (herein called the "Final Office Action" and attached as Exhibit B).
2. The Final Office Action set forth grounds of rejection, which relied on German Patent Application Publication No. DE 4001041 A1 (herein called "Frye" and attached as Exhibit C), which was cited for the first time by the Examiner in the Final Office Action.
3. Frye is a foreign language document, which does not contain text in the English language.

4. The Examiner neither relied upon an English translation of Frye nor provided such an English translation prior to or with the Final Office Action.
5. Applicant appealed the rejections set forth in the Final Office Action and filed an Appeal Brief on February 15, 2010.
6. In the Examiner's Answer (Exhibit A), the Examiner for the first time relied on an English translation of Frye, which the Examiner introduced for the first time in the Examiner's Answer. *See, for example*, the English Abstract of Frye appended to the Examiner's Answer; p. 3 of Examiner's Answer (setting forth the evidence relied on by the Examiner); and pp. 4-8 of Examiner's Answer (setting forth arguments that rely extensively on the English translation of Frye).
7. Although all of the rejections that are set forth in the Examiner's Answer are based at least in part on the English translation of Frye, the Examiner's Answer does not designate any new grounds of rejection.

Thus, the Examiner has introduced and extensively relied upon new evidence (the English translation of Frye) in the §§ 102 and 103 rejections of the claims for the first time in the Examiner's Answer without designating any new grounds of rejection. This is clearly improper, however, as Applicant has been deprived of due process in that Applicant neither had the opportunity to address these new grounds of rejection prior to the filing of the Appeal Brief nor has the Examiner afforded Applicant the opportunity to reopen prosecution by designating the new grounds of rejection.

It is improper for the Examiner to rely on a foreign language document without providing an English translation of the underlying document, especially when the English translation was not provided until the Final Office Action. M.P.E.P. § 706.02.II. In this regard, Section 702.02.II of the M.P.E.P. states that regarding foreign language documents that have an English Abstract, "in limited circumstances, it may be appropriate for the examiner to make a rejection in a non-final office action based in whole or in part on the Abstract only without relying on the full text document," and provide, "a translation (if not in English). . . in the next Office action. " In this case, Frye did not have an English Abstract; and the English translation of Frye was not provided prior to or even with the Final Office Action.

Thus, the Examiner has for the first time on appeal cited and relied upon an English translation of a foreign language reference, which was cited for the first time in the Final Office Action. Moreover, there is neither an acknowledgement of the new grounds of rejection in the Examiner's Answer nor a signature by the Technology Center Director or designee, acknowledging the new grounds of rejection.

It is noted that the Examiner's argument in the Examiner's Answer are primarily focused on the English translation of Frye, and the underlying text was not apparent from Frye's figures. For example, on pages 5 and 6 of the Examiner's Answer, the Examiner relies on Frye's discussion of an adhesive layer, which is designated by reference numeral 30 in Figs. 1 and 3 of Frye. Additionally, the Examiner relies on language of Frye that the Examiner contends discloses that a charge cap breaks or fractures from the body of the shaped charge in the boundary that is defined by the adhesive layer. *See, for example*, pp. 5 and 6 of the Examiner's Answer. It is not apparent from Frye, however, without the underlying English translation, that element 30 is an adhesive; and it is not apparent from Frye, without the underlying English translation, that the charge cap purportedly fractures along the adhesive line as contended by the Examiner.

Thus, for at least the foregoing reasons, the Examiner has set forth new grounds of rejection for the claims in the Examiner's Answer without designating them as such. Therefore, Applicant requests the Technology Director to require the Examiner to withdraw the Examiner's Answer and mail out a corrected Examiner's Answer designating the new grounds of rejection. M.P.E.P. § 1207.03.IV.

No fee is believed due with this petition. However, should a petition fee be due, the Commissioner is authorized to charge the petition fee and any other fees or credit any overpayment to Deposit Account No. 20-1504 (SHL.0227US).

Date: 7-07-10

Respectfully submitted,

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# **EXHIBIT A**



# UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/027,727	12/21/2001	Chenghua Oliver Han	22.1450	9783

7590                    05/07/2010  
SCHLUMBERGER TECHNOLOGY CORPORATION  
14910 Airline Road  
P.O. Box 1590  
Rosharon, TX 77583-1590

EXAMINER
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JOHNSON, STEPHEN

ART UNIT	PAPER NUMBER
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3641

MAIL DATE	DELIVERY MODE
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05/07/2010

PAPER

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APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
10027727	12/21/01	HAN, CHENGHUA OLIVER	22.1450

EXAMINER

Stephen M.. Johnson

ART UNIT	PAPER
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3641                  20100429

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/027,727

Filing Date: December 21, 2001

Appellant(s): HAN, CHENGHUA OLIVER

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Fred C. Pruner Jr.  
For Appellant

**EXAMINER'S ANSWER**

Art Unit: 3641

This is in response to the appeal brief filed on February 16, 2010 appealing from the Office action mailed August 11, 2009.

**(1) Real Party in Interest**

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

**(2) Related Appeals and Interferences**

The following are the related appeals, interferences, and judicial proceedings known to the examiner which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal:

This application was the subject of Appeal 2008-6047, in which the examiner was affirmed, in a Decision on Appeal that was decided on December 18, 2008.

**(3) Status of Claims**

The following is a list of claims that are rejected and pending in the application:

Claims 1, 6-7, 17-19, 23, 25, 28, 30, 33, 35, and 42-45 are pending claims that are rejected.

**(4) Status of Amendments After Final**

No amendments after final have been filed. A request for reconsideration was filed on 10/13/2009 but the arguments were not convincing.

**(5) Summary of Claimed Subject Matter**

The examiner has no comment on the summary of claimed subject matter contained in the brief.

**(6) Grounds of Rejection to be Reviewed on Appeal**

A. Claims 1, 33, and 42 are rejected under 35 U.S.C. 102(b) as being anticipated by Frye et al. (041).

B. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Frye et al. (041) in view of Turechek (857).

C. Claims 6 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frye et al. (041) in view of Chawla et al. (008).

### **WITHDRAWN REJECTIONS**

The following grounds of rejection (D and E) are not presented for review on appeal because they have been withdrawn by the examiner. The rejection of claims 1, 7, 23, 25, 33, 35, 42-43, and 45 as being anticipated by Willow (505) and the rejection of claims 6 and 44 under 35 USC 103 as being obvious over Willow (505) in view of Chawla et al. (008). Please note the result of the Pre-Brief Appeal Conference Decision as mailed on 12/15/2009.

### **(7) Claims Appendix**

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

### **(8) Evidence Relied Upon**

The following is a listing of the evidence (e.g., patents, publications, Official Notice, and admitted prior art) relied upon in the rejection of claims under appeal.

German Patent DE 40 01 041 A1	Frye et al.	7/18/1991
U.S. Patent 2,742,857	Turechek	4/24/1956
U.S. Patent 5,619,008	Chawla et al.	4/08/1997

English translation of DE 40 01 041 A1

### (9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

A. Claims 1, 33, and 42 are rejected under 35 U.S.C. 102(b) as being anticipated by Frye et al. (041).

Frye et al. (041) disclose a perforating system comprising:

- a) a charge case of a shaped charge; figs. 1-3
- a') the charge case having a wall and recessed region; 10, 16 in combination
- b) an explosive in the charge case; 14
- c) a liner in the charge case; and 12
- d) an axially oriented slot in the wall. [26, 30] or [32, 34]

B. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Frye et al. (041) in view of Turechek (857).

Frye et al. (041) apply as previously recited. However, undisclosed is a perforating gun string including a loading tube and associated shaped charge carrier. Turechek (857) teach a perforating gun string that includes a loading tube and associated shaped charge carrier (6, 15). Applicant is selecting a well known usage for shaped charges and putting them to use as they are commonly known in this art with expected or predictable results (see KSR Int'l Co. v. Teleflex, Inc., 550 U.S. 398, 406 (2007)). It would have been obvious to a person of ordinary skill in this art at the time of the invention to apply the teachings of Turechek to the Frye et al. shaped chare assembly and have a shaped charge assembly with associated loading tube and shaped charge carrier.

C. Claims 6 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frye et al. (041) in view of Chawla et al. (008).

Frye et al. (041) apply as previously recited. However, undisclosed is a recessed fracture region that is a v-shaped cut. Chawla et al. (008) teach a recessed fracture region that is a v-shaped cut 46. Applicant is substituting one type of recessed fracture region for another in an analogous art setting with expected or predictable results (see KSR Int'l Co. v. Teleflex, Inc., 550 U.S. 398, 406 (2007)). It would have been obvious to a person of ordinary skill in this art at the time of the invention to apply the teachings of Chawla et al. to the Frye et al. perforating system and have a perforating system with a differently shaped recessed fracture region.

#### **(10) Response to Argument**

A. Applicant's arguments with regard to the rejection of claims 1, 33, and 42 are rejected under 35 U.S.C. 102(b) as being anticipated by Frye et al. (041) are addressed as follows. It is argued that items 26, 30, 32, and 34 do not qualify as slots. In response, with regard to 26, 30; note that item 30 is an adhesive (see English translation; page 2, last paragraph). The adhesive 30 is located in the slot between items 10 and 16 of the shaped charge housing. During firing of the shaped charge and separation of ring 10 from base 16; the adhesive 32 is fractured along the slot in which it is contained (see fig. 1) (see English translation page 2, last 2 paragraphs). With regard to 32, 34; the English translation explicitly states that this disclosure is directed to break sections that are described as circumferential ring slots (see page 3, lines 12-23 of the English translation).

It is further argued that the grooves or slots do not extend along an axis that is axially oriented. In response, note that what applicant has claimed is "at least one axially oriented slot". Note that slots 32 and 34 extend in a radial or ring fashion but also contain an axially oriented component associated with the depth of the slot and its associated orientation (see 32 in fig. 3). With regard to the slot that contains adhesive 30 (see fig. 1) clearly the middle portion of the slot that contains adhesive 30 is axially oriented (see fig. 1).

1). It is argued that there is no fracturing about 26, 30 with regard to the body 16. In response, it is the adhesive 30 contained in the slot between 10 and 16 that fractures along the lines of the created slot bordering 10 and 16. It is argued that there is no recitation of fracturing about a groove or slot when the explosive charge is fired. In response; note page 2, last 2 paragraphs of the English translation. Further, the claim limitations do not require the groove or slot to fracture during firing of the explosive charge because applicant has only claimed "at least one axially oriented slot in the wall about which the charge case **is adapted to fracture** in response to detonation". It is argued that the claim limitation directed to a wall that defines a recessed region in which a liner is disposed and in which an explosive material is received is not present. In response, note wall assembly 10, 16 and the liner 12 and explosive 14 that is enclosed in the recess defined by wall assembly 10, 16 (see figs. 1-3).

B. Applicant's arguments with regard to the rejection of Claim 17 being rejected under 35 U.S.C. 103(a) as being unpatentable over Frye et al. (041) in view of Turechek (857) are addressed as follows. Most of applicant's arguments are directed to Frye et al. and not to the combination of Frye et al. in view of Turechek. These arguments have already been

addressed in section A above. Applicant argues that Turechek is not directed to a perforating gun string. In response, note the string of perforating shaped charge arrangements as illustrated in figs. 1-5 and the associated written description. Applicant argues that one of ordinary skill would have no plausible reason to combine Frye and Turechek to provide a list of missing claim limitations. In this regard, the supposed missing claim limitations are explicitly disclosed as being contained solely present in Frye except for the perforating string with associated plurality of shaped charge liners. With regard to the issue of motivation to combine; shaped charge liners are commonly known by anyone of skill in this art to be used in both perforating guns as well as shaped charges in war heads. The idea that any particular shaped charge could be used in either or both environments would require a level a skill considerably less than the requirement of one of ordinary skill in this art. Consequently, the issue of motivation to combine is clearly met (see KSR Int'l Co. v. Teleflex, Inc., 550 U.S. 398, 406 (2007)).

C. Applicant's arguments with regard to the rejection of Claims 6 and 44 being rejected under 35 U.S.C. 103(a) as being unpatentable over Frye et al. (041) in view of Chawla et al. (008) are addressed as follows. It is argued that Chawla et al. is directed to liners and in particular to a manufacturing process for liners. This is accurate. However, Chawla et al. is also directed to fracturing a wall via an applied force about a slot or groove in the explosive art. This is clearly an analogous art environment in the context of both the explosive art as well as the art associated with breaking a wall via an already scored, slotted, or grooved wall configuration. With regard to the issue of any plausible reason to combine or motivation to combine; the issue of analogous art setting has already been

addressed and shown. The motivation is merely substitution of one scoring slot configuration specifically designed for fracture along the slot configuration for another in an analogous art setting (see KSR Int'l Co. v. Teleflex, Inc., 550 U.S. 398, 406 (2007)).

Applicant appears to be of the opinion that one of ordinary skill would not have enough imagination to know that different types and shapes of scoring slots could be used in the Frye et al. device. Such is the case even after an explicit demonstration of alternative shaped scoring slots (compare slots 32 and 34 of Frye et al.) and even after an explicit teaching of an alternative type of scoring slot arrangement (see 46 in Chawla et al.). It is further argued that there is no reason for one of ordinary skill in this art to substitute the Chawla et al. liner for the liner of Frye et al. In response, this argument makes it quite clear that applicant does not understand the clearly stated grounds for motivation as stated by the examiner. It is the recessed fracture region or scoring slot arrangement that is being substituted for **and not the liner**. In particular, a v-shaped scoring slot is being substituted for a u-shaped scoring slot as taught in 32 of Frye et al. This substitution has nothing to do with substituting liners as is now being argued by applicant. With regard to the argument that the score marks do not exist after manufacturing. This is also not directed to the motivation to combine. Regardless of when or where the fractured scoring is taught in Chawla et al. including during the manufacture process; v-shaped scoring slots designed to fracture about the scoring are taught in Chawla et al. (46; col. 3, lines 64-67) and this is the teaching being relied upon by the examiner.

**(11) Related Proceeding(s) Appendix**

This application was the subject of Appeal 2008-6047, in which the examiner was affirmed, in a Decision on Appeal that was decided on December 18, 2008.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Stephen M. Johnson/

Primary Examiner, Art Unit 3641

Group 3600

Conferees:

Heather Shackelford /hcs/

Michael Carone /mjc/

Result Page

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The invention relates to a mounting ring after the features indicated in the preamble of the claim 1.

A such mounting ring comes out for example from in the DE 34 28 488 C2 represented shaped-charge warhead. The interiorlateral arrangement of the attachment ring at sheath of the warhead serves here the front fixation of a shaped-charge insert. The arrangement of the attachment ring before the shaped-charge insert does not harm the same, because the formation of a central shaped-charge jet does not become substantial affected by the mounting ring.

However the edge region of the insert is critical for the tail training of the projectile, with a projectile-formed charge. With the use of a ring the hindered undeformed range of the ring the projectile training serving at the warhead covering interiorlaterally fixed and the axial support of a projectile-formed insert (agony situation), whereby are possible with the insert wastes at the edge of insert, which can lead to performance-reducing tail training.

Object of the invention is it to train the mounting ring initially specified so and/or, at the warhead to arrange, D before the firing delivery of the warhead a safe axial fixation of a agony situation of ensured is and during the detonation phase unimpaired projectile training by the insert possible is.

Dissolved one becomes this object by the features listed in the characterizing part of the claim 1.

Advantageous embodiments and developments of the invention come out from the features of the Unteransprüche.

The invention possible it in advantageous manner one to the axial fixation of the agony situation during the firing procedure of an inertial projectile and the output procedure from the same required fixing beginning either by loosening of the whole ring or of ring segments of the sheath of the warhead or by separations of the radial inward pointing fixing beginning from the mounting ring to remove the fixing beginning from the moving path the agony situation before the formation of the complete projectile.

To optimize the invention allowed it in other advantageous manner the measures of the ring beginning and by varying the beginning-prolonged and beginning-thick of the intensity of the load, required to the axial fixation, and/or, to adapt the case of load. So it can already be sufficient for example during comparatively low load to implement the beginning-prolonged and the beginning-thick only few tenths of a millimeter so that the tracing formation becomes also only insignificant gestör.

The receptacle large becoming loads also the beginning-prolonged and the beginning-thick can become large practiced.

To solve in addition the possible invention for the guarantee of an unimpaired tracing formation on the one hand the whole mounting ring front from the warhead covering to, so that to the time of a diameter reduction incoming during the tracing formation the projectile can travel through unimpaired by the mounting ring or that radial detaching of the ring segments of the warhead

covering a troublefree tracing formation ensured, made by a Ringsegmentierung. On the other hand a break section can provide for a timed Abtrennung of the fixing beginning of the mounting ring, taking place before the tracing formation, for unimpaired projectile training.

The invention becomes on the basis several embodiments of the closer explained represented in the designs.

It shows:

Fig. 1 a warhead with agony situation and a mounting ring to the axial support of the agony situation in the half-section,

Fig. 2 an axial and radial agony situation in a partial section, resting against the mounting ring,

Fig. 3 an enlarged view of one in the Fig. 1 detail characterized with III,

Fig. 4 a mounting ring in a plan view, existing from partial segments,

Fig. 5 a schematic representation of disturbed projectile training with a known rigid mounting ring disposed at the warhead covering,

Fig. 6 a schematic representation of unimpaired projectile training, as it arises by the invention.

In the Fig. 1 are with 10 a mounting ring, with 12 a projectile-formed insert (agony situation), with 14 an explosive charge and with 52 an igniting and a transmission unit of a warhead 18 designated. The projectile-formed insert 12 limited the front explosive charge 14 and rests to outside against the inside of the warhead covering 16.

The warhead 18 is preferably formed as submunition bodies and becomes for example one above the other stacked in not represented manner of a load projectile into a target area transported, over this from the inertial projectile ejected and subsequent for the fight of the target ignited. To the formation of a projectile 46 (Fig. 6) becomes the explosive charge 14 in known manner of the igniting and transmission unit 52 ignited.

The insert can be in actual known manner within the warhead pressed and/or bonded. These connections rich however alone not out, in order to take up with the firing of the inertial projectile or the forces arising with the ejection of the warhead from the inertial projectile, resultant irreversible changes of position and/or deformations of the insert, for example shifting, tilting or even falling out the insert 12 from the warhead covering 16, can affect the later projectile-formed formation negative.

Known solutions, with which the insert is interiorlateral at the warhead covering 16 for example by a welding or a screw connection fixed, lead to significant outlet disturbances of the projectile 46 (Fig. 5).

For example a known initially described and interiorlaterally in the sheath mounting ring 24 incorporated prevents 16 before the insert 12 - as it in the Fig. 5 shown actual the edge of insert at the formation of achievement-increasing tail training thereby that the edge of the insert 12 disintegrates by that rigid ring 24 into fragments 50 fixed at the warhead covering 16 and thus a projectile 46 develops, in its outlet and in its later flight behavior disturbed is and thus no controlled flight the possible.

In the various embodiments in the Fig. 1 to 4 represented mounting ring 10 contains however, to the front attachment of the insert 12, an hollow cylinder 22 inverted around an outside covering paragraph 20 and inward a pointing fixing beginning 24 radial before the projectile-formed insert 12 as well as the bottom detonation pressure effective becoming means 28, 30, 32, 34, 40 for outside detaching of the attachment ring 10 from the warhead covering 16 or to the separation of the fixing beginning 24 from the mounting ring 10.

In accordance with the Fig. the boundary surfaces 26 of the hollow cylinder 22 and the covering paragraph 20 by connection means 28, 30, for example an adhesive binding or, can do 1 like it the Fig., by a weld connected shows 2 its, whereby the respective compound is so practiced that the bottom detonation effect a separation of the attachment ring is 10 16 possible of the warhead

covering.

This separation made with the detonation of the explosive charge 14 of the bottom 10 detonation clouds acting in axial direction 36 on the mounting ring, whereby the mounting ring 10 to beginnings of the formation of the projectile 48 (Fig. 6) from the sheath solves 18, so that a projectile tail reduced in the diameter can leave the range of the attachment ring 10.

In accordance with Fig. 1 rests the insert 12 outside against the inside of the approach 20 of the warhead covering 16, whereby a simple Laborierung and a direct explosive catch are possible.

In accordance with Fig. the insert 12 outside rests to 2 against a hollow cylinder beginning 54, whereby favourably with the detonation of the charge 14 for example by the Aufbeulung of the insert 12 and the immediate cloud pressure the mounting ring 10 additional in radial direction 56 (Fig. 4) moved becomes.

To the receptacle the fixing beginning 24 can exhibit different axial loads a different length l and thickness A. With small axial loads the length l can amount to 0.2 mm and with larger loads for example 14 mm. The thickness A can amount to with small loads 0.2 mm with larger loads 2 mm. In order to avoid influences of noise with large becoming fixing beginning 24 on the projectile training, is one in the Fig. 3 represented break section 32, 34 for a defined separation of a partial volume of the attachment ring 10 provided located in the axial range of movement of the insert 12. The break section 32 is disposed as circumferential groove formed and can the maxialen insert diameter D a corresponding diameter exhibit as well as the insert 12 axial opposite at the fixing beginning 24 be.

Alternative one can be the break section 34 as circumferential ring slot at the transition of the axial lateral surface 26,1 to the radial base 26,2 of the hollow cylinder 22 disposed.

The Fig. it shows 4 that the mounting ring 10 additional can separate to the before-described actions the also bottom spin effect of the warhead 18 in radial direction 56 from the warhead covering 16. In addition the mounting ring 10 from at least two attachment ring part segments 38 exhibiting, which can be held together so long by a not represented fuse, exists a same Umfangswinkel, until the separation becomes initiated by spin dismantling. In the represented embodiment three partial segments are 38 shown, which exhibit radial directed contact surfaces 40 and a recess 42 for troublefree detaching outward opposite a spin safety lock pin 44 fixed at the warhead covering 16.

The mounting ring 10 can consist of a material independent of the insert 12 and the warhead covering 16, for example of steel. Reference symbol list 10 mounting ring

12 insert

14 charge

16 sheath

18 warhead

20 covering paragraph

22 hollow cylinders

24 fixing beginning

26 boundary surface

26,1 lateral surface 26,2 base

28, 30 connection means

32, 34 break section

36 axial direction

38 partial segment

40 contact surface

42 recess

44 spin safety lock pin

46 projectile

48 projectile

50 fragments

52 igniting and transmission unit

54 hollow cylinder beginning

56 direction

D = diameter

l = length

A = thickness

## EAST Search History

### EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	305	(89/36.01). CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/04/29 14:45

4/ 29/ 10 2:45:53 PM

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# **EXHIBIT B**



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.	
10/027,727	12/21/2001	Chenghua Oliver Han	22.1450	9783	
7590	08/11/2009	SCHLUMBERGER TECHNOLOGY CORPORATION			
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R E C E I V E D  
AUG 25 2009

Trop, Pruner, & Hu, P.C.

Mail Date: 8-11-09  
Due Date: 10-11-09  
Act. Req.: 2-mo. resp to FOA  
  
11-11-09  
3-mo. resp to FOA  
 TphDkt  Access/Excel  CltDkt

<b>Office Action Summary</b>	Application No.	Applicant(s)
	10/027,727	HAN, CHENGHUA OLIVER
	Examiner	Art Unit
	Stephen M. Johnson	3641

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A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1)  Responsive to communication(s) filed on 26 May 2009.
- 2a)  This action is FINAL.      2b)  This action is non-final.
- 3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4)  Claim(s) 1,6,7,17-19,23,25,28,30,33,35 and 42-45 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5)  Claim(s) \_\_\_\_\_ is/are allowed.
- 6)  Claim(s) 1,6,7,17-19,23,25,28,30,33,35 and 42-45 is/are rejected.
- 7)  Claim(s) \_\_\_\_\_ is/are objected to.
- 8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9)  The specification is objected to by the Examiner.
- 10)  The drawing(s) filed on \_\_\_\_\_ is/are: a)  accepted or b)  objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a)  All: b)  Some \* c)  None of:
    1.  Certified copies of the priority documents have been received.
    2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date: _____
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) <input type="checkbox"/> Notice of Informal Patent Application
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date: _____	6) <input type="checkbox"/> Other: _____

Art Unit: 3641

1. The following Office action is in response to the RCE as filed on 2/6/2009. Claims 1, 6-7, 17-19, 23, 25, 28, 30, 33, 35, and 42-45 remain active in the case. Claims 2-5, 8-16, 20-22, 24, 26-27, 29, 31-32, 34, and 36-41 have been cancelled.

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless —

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 7, 23, 25, 33, 35, 42-43, and 45 are rejected under 35 U.S.C. 102(b) as being anticipated by Frye et al. (041).

Frye et al. (041) disclose a perforating system comprising:

- a) a charge case of a shaped charge; 16, 10
- b) an explosive in the charge case; 14
- c) a liner in the charge case; and 12
- d) an axially oriented slot in the wall. [26, 30] or 32 or 34

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 17-19, 28, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frye et al. (041) in view of Turechek (857).

Frye et al. (041) apply as previously recited. However, undisclosed is a perforating gun string including a loading tube and associated shaped charge carrier. Turechek (857)

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teach a perforating gun string that includes a loading tube and associated shaped charge carrier (6, 15). Applicant is selecting a well known usage for shaped charges and putting them to use as they are commonly known in this art with expected or predictable results. It would have been obvious to a person of ordinary skill in this art at the time of the invention to apply the teachings of Turechek to the Frye et al. shaped charge assembly and have a shaped charge assembly with associated loading tube and shaped charge carrier.

6. Claims 6 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frye et al. (041) in view of Chawla et al. (008).

Frye et al. (041) apply as previously recited. However, undisclosed is a recessed fracture region that is a v-shaped cut. Chawla et al. (008) teach a recessed fracture region that is a v-shaped cut 46. Applicant is substituting one type of recessed fracture region for another in an analogous art setting with expected or predictable results. It would have been obvious to a person of ordinary skill in this art at the time of the invention to apply the teachings of Chawla et al. to the Frye et al. perforating system and have a perforating system with a differently shaped recessed fracture region.

7. Claims 1, 7, 23, 25, 33, 35, 42-43, and 45 are rejected under 35 U.S.C. 102(b) as being anticipated by Willow (505).

Willow (505) disclose a perforating system comprising:

a) a charge case of a shaped charge;	12
b) an explosive in the charge case;	27
c) a liner in the charge case; and	[26] or [16, 26]
d) an axially oriented slot in the wall.	21

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8. Claims 6 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Willow (505) in view of Chawla et al. (008).

Willow (505) applies as previously recited. However, undisclosed is a recessed fracture region that is a v-shaped cut. Chawla et al. (008) teach a recessed fracture region that is a v-shaped cut 46. Applicant is substituting one type of recessed fracture region for another in an analogous art setting with expected or predictable results. It would have been obvious to a person of ordinary skill in this art at the time of the invention to apply the teachings of Chawla et al. to the Willow perforating system and have a perforating system with a differently shaped recessed fracture region.

9. Applicant's arguments with respect to claims 1, 6-7, 17-19, 23, 25, 28, 30, 35, and 42-45 have been considered but are moot in view of the new ground(s) of rejection.

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen M. Johnson whose telephone number is 571-272-6877 and whose e-mail address is ([Stephen.Johnson@uspto.gov](mailto:Stephen.Johnson@uspto.gov)). The examiner can normally be reached on Tuesday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Carone can be reached on 571-272-6873. The Central FAX phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 800-786-9199.

/Stephen M. Johnson/  
Primary Examiner, Art Unit 3641

SMJ  
August 10, 2009

<b>Notice of References Cited</b>	Application/Control No. 10/027,727	Applicant(s)/Patent Under Reexamination HAN, CHENGHUA & OLIVER
	Examiner Stephen M. Johnson	Art Unit 3641

**U.S. PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A US-6,047,505	04-2000	Willow, Robert E.	52/98
*	B US-2,742,857	04-1956	TURECHEK GEORGE F	102/310
*	C US-5,619,008	04-1997	Chawla et al.	102/310
D	US-			
E	US-			
F	US-			
G	US-			
H	US-			
I	US-			
J	US-			
K	US-			
L	US-			
M	US-			

**FOREIGN PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
N	DE 40 01 041 A1	07-1991	Germany	Frye et al.	
O					
P					
Q					
R					
S					
T					

**NON-PATENT DOCUMENTS**

*	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)		
U			
V			
W			
X			

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

# **EXHIBIT C**



⑪ Aktenzeichen: P 4001 041.4  
⑫ Anmeldetag: 16. 1. 90  
⑬ Offenlegungstag: 18. 7. 91

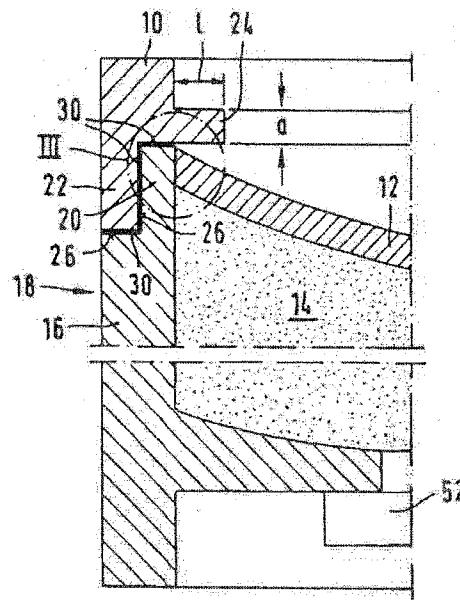
⑪ Anmelder:  
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⑫ Erfinder:  
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Dipl.-Ing., 4018 Langenfeld, DE; Jakoby, Karin,  
Ing.(grad.), 4030 Ratingen, DE

Prüfungsantrag gem. § 44 PatG ist gestellt.

④ Befestigungsring zur axialen Fixierung einer projektilbildenden Einlage

⑤ Die Erfindung betrifft einen Gefechtskopf bei dem ein zur Abschluß- und ausstoßsicheren axialen Befestigung einer projektilbildenden Einlage benötigter Befestigungsring derart an der Gefechtskopfhülle zu befestigen ist, daß während der Detonationsphase eine ungestörte Projektilausbildung möglich ist. Insbesondere sollen zur Vermeidung einer leistungsmindernden Heckausbildung Materialverluste im Randbereich eines Projektils vermieden werden, wie sie bei herkömmlichen Befestigungsringen durch eine starre Befestigung an der Gefechtskopfhülle auftreten. Dazu enthält der Befestigungsring (10) einen um einen äußeren Hüllenabsatz (20) gestülpten Hohlzylinder (22) und einen vor einer projektilbildenden Einlage (12) radial nach innen weisenden Fixieransatz (24) sowie unter dem Detonationsdruck wirksam werdende Mittel zum außenseitigen Lösen des Befestigungsringes (10) von der Gefechtskopfhülle (16) oder zum Abtrennen des Fixieransatzes (24) vom Befestigungsring (10). Zum Abtrennen des Fixieransatzes (24) kann beispielsweise dieser mit einer umlaufenden Sollbruchstelle versehen sein. Alternativ kann der Befestigungsring (10) aus radial von der Gefechtskopfhülle (16) sich lösenden Teilssegmenten bestehen.



1  
Beschreibung

Die Erfindung betrifft einen Befestigungsring nach den im Oberbegriff des Patentanspruchs 1 angegebenen Merkmalen.

Ein derartiger Befestigungsring geht beispielsweise aus einem in der DE 34 28 488 C2 dargestellten Hohlladungsgefechtkopf hervor. Die innenseitige Anordnung des Befestigungsringes an der Hülle des Gefechtkopfes dient hier der vorderseitigen Fixierung einer Hohlladungseinlage. Die Anordnung des Befestigungsringes vor der Hohlladungseinlage schadet derselben nicht, weil die Ausbildung eines zentralen Hohlladungsstrahles nicht wesentlich durch den Befestigungsring beeinträchtigt wird.

Hingegen ist bei einer projektilbildenden Ladung der Randbereich der Einlage entscheidend für die Heckausbildung des Projektils. Beim Einsatz eines an der Gefechtkopfhülle innenseitig befestigten und der axialen Abstützung einer projektilbildenden Einlage (P-Einlage) dienenden Ringes behindert der unverformte Bereich des Ringes die Projektilausbildung, wodurch bei der Einlage Materialverluste am Einlagenrand möglich sind, die zu einer leistungsmindernden Heckausbildung führen können.

Aufgabe der Erfindung ist es, den eingangs genannten Befestigungsring derartig auszubilden bzw. am Gefechtkopf anzugeben, daß vor der Schußabgabe des Gefechtkopfes eine sichere axiale Fixierung einer P-Einlage gewährleistet ist und während der Detonationsphase eine ungestörte Projektilausbildung durch die Einlage möglich ist.

Gelöst wird diese Aufgabe durch die im kennzeichnenden Teil des Patentanspruchs 1 aufgeführten Merkmale.

Vorteilhafte Ausgestaltungen und Weiterbildungen der Erfindung gehen aus den Merkmalen der Unteransprüche hervor.

Die Erfindung ermöglicht es in vorteilhafter Weise einen zur axialen Fixierung der P-Einlage während des Abschußvorganges eines Trägergeschosses und des Ausstoßvorganges aus demselben benötigten Fixieransatz entweder durch Lösen des ganzen Ringes oder von Ringsegmenten von der Hülle des Gefechtkopfes oder durch Abtrennen des radial nach innen weisenden Fixieransatzes vom Befestigungsring, den Fixieransatz aus der Bewegungsbahn der P-Einlage vor der Ausbildung des vollständigen Projektils zu entfernen.

Die Erfindung gestattet es in weiter vorteilhafter Weise die Masse des zur axialen Fixierung erforderlichen Ringansatzes zu optimieren und durch Variierung der Ansatzlänge und Ansatzdicke der Intensität der Belastung bzw. dem Belastungsfall anzupassen. So kann es beispielsweise bei vergleichsweise niedriger Belastung bereits genügen, die Ansatzlänge und die Ansatzdicke nur wenige Zehntel-Millimeter auszuführen, so daß die P-Ausbildung auch nur unwesentlich gestört wird.

Zur Aufnahme größer werdender Belastungen kann auch die Ansatzlänge und die Ansatzdicke größer ausgeführt werden.

Dazu ermöglicht die Erfindung zur Gewährleistung einer ungestörten P-Ausbildung einerseits den ganzen Befestigungsring vorderseitig von der Gefechtkopfhülle zu lösen, so daß zum Zeitpunkt einer bei der P-Ausbildung eintretenden Durchmesserreduzierung das Projektil ungestört durch den Befestigungsring hindurchfliegen kann oder daß ein durch eine Ringsegmentierung erfolgtes radiales Lösen der Ringsegmente von

der Gefechtkopfhülle eine störungsfreie P-Ausbildung gewährleistet. Andererseits kann eine Sollbruchstelle für eine zeitlich vor der P-Ausbildung stattfindende Abtrennung des Fixieransatzes vom Befestigungsring s für eine ungestörte Projektilausbildung sorgen.

Die Erfindung wird anhand mehrerer in den Zeichnungen dargestellte Ausführungsbeispiele des näheren erläutert.

Es zeigt:

Fig. 1 einen Gefechtkopf mit P-Einlage und einen Befestigungsring zur axialen Abstützung der P-Einlage im Halbschnitt,

Fig. 2 eine axial und radial am Befestigungsring anliegende P-Einlage in einem Teilschnitt,

Fig. 3 eine vergrößerte Darstellung einer in der Fig. 1 mit III gekennzeichneten Einzelheit,

Fig. 4 einen aus Teilsegmenten bestehenden Befestigungsring in einer Draufsicht,

Fig. 5 eine schematische Darstellung einer gestörten Projektilausbildung bei einem bekannten starr an der Gefechtkopfhülle angeordneten Befestigungsring,

Fig. 6 eine schematische Darstellung einer ungestörten Projektilausbildung, wie sie durch die Erfindung auftritt.

In der Fig. 1 sind mit 10 ein Befestigungsring, mit 12 eine projektilbildende Einlage (P-Einlage), mit 14 eine Sprengladung und mit 52 eine Zünd- und Übertragungseinheit eines Gefechtkopfes 18 bezeichnet. Die projektilbildende Einlage 12 begrenzt vorderseitig die Sprengladung 14 und liegt außen seitig an der Innenseite der Gefechtkopfhülle 16 an.

Der Gefechtkopf 18 ist vorzugsweise als Submunitionskörper ausgebildet und wird beispielsweise übereinander gestapelt in nicht dargestellter Weise von einem Lastengeschoß in ein Zielgebiet transportiert, über diesem aus dem Trägergeschoß ausgestoßen und anschließend zur Bekämpfung des Ziels gezündet. Zur Ausbildung eines Projektils 48 (Fig. 6) wird dazu die Sprengladung 14 in bekannter Weise von der Zünd- und Übertragungseinheit 52 gezündet.

Die Einlage kann in an sich bekannter Weise innerhalb des Gefechtkopfes eingepreßt und/oder eingeklebt sein. Diese Verbindungen reichen jedoch allein nicht aus, um die beim Abschuß des Trägergeschosses oder die beim Ausstoß des Gefechtkopfes aus dem Trägergeschoß auftretenden Kräfte aufzunehmen. Die dabei entstehenden irreversiblen Lageveränderungen und/oder Verformungen der Einlage, beispielsweise Verschieben, Verkanten oder sogar Herausfallen der Einlage 12 aus der Gefechtkopfhülle 16, können die spätere projektilbildende Ausbildung negativ beeinflussen.

Bekannte Lösungen, bei denen die Einlage innenseitig an der Gefechtkopfhülle 16 beispielsweise durch eine Schweiß- oder Schraubverbindung befestigt ist, führen zu erheblichen Abgangsstörungen des Projektils 46 (Fig. 5).

Beispielsweise hindert ein bekannter eingangs beschriebener und innenseitig in der Hülle 16 vor der Einlage 12 eingebauter Befestigungsring 24 – wie er in der Fig. 5 dargestellt ist – den Einlagenrand an der Ausbildung einer leistungssteigernden Heckausbildung dadurch, daß der Rand der Einlage 12 durch den starr an der Gefechtkopfhülle 16 befestigten Ring 24 in Bruchstücke 50 zerfällt und somit ein Projektil 46 entsteht, das in seinem Abgangs- und in seinem späteren Flugverhalten gestört ist und somit keinen kontrollierten Flug ermöglicht.

Der in den verschiedenen Ausführungsformen in den Fig. 1 bis 4 dargestellte Befestigungsring 10 enthält hingegen, zur vorderseitigen Befestigung der Einlage 12, einen um einen äußeren Hüllenabsatz 20 gestülpten Hohlzylinder 22 und einen vor der projektilbildenden Einlage 12 radial nach innen weisenden Fixieransatz 24 sowie unter dem Detonationsdruck wirksam werdende Mittel 28, 30, 32, 34, 40 zum außenseitigen Loslösen des Befestigungsringes 10 von der Gefechtskopfhülle 16 oder zum Abtrennen des Fixieransatzes 24 vom Befestigungsring 10.

Gemäß der Fig. 1 können die Begrenzungsfächen 26 des Hohlzylinders 22 und des Hüllenabsatzes 20 durch Verbindungsmittel 28, 30, beispielsweise eine Klebverbindung oder, wie es die Fig. 2 zeigt, durch eine 15 Schweißverbindung verbunden sein, wobei die jeweilige Verbindung derartig ausgeführt ist, daß unter der Detonationswirkung eine Trennung des Befestigungsringes 10 von der Gefechtskopfhülle 16 möglich ist.

Diese Trennung erfolgt bei der Detonation der Sprengladung 14 unter den in axialer Richtung 36 auf den Befestigungsring 10 wirkenden Detonationsgeschwindigkeiten, wobei der Befestigungsring 10 zu Beginn der Ausbildung des Projektils 48 (Fig. 6) von der Hülle 18 löst, so daß ein im Durchmesser reduziertes Projektilheck den Bereich des Befestigungsringes 10 verlassen kann.

Gemäß Fig. 1 liegt die Einlage 12 außenseitig an der Innenseite des Ansatzes 20 der Gefechtskopfhülle 16 an, wodurch eine einfache Laborierung und ein direkter Sprengstoffverschluß möglich ist.

Gemäß Fig. 2 liegt die Einlage 12 außenseitig an einem Hohlzylinderansatz 54 an, wodurch vorteilhaft bei der Detonation der Ladung 14 beispielsweise durch die Aufbeulung der Einlage 12 und des unmittelbaren Schwadendruckes der Befestigungsring 10 zusätzlich in 55 radialer Richtung 56 (Fig. 4) bewegt wird.

Zur Aufnahme unterschiedlicher axialer Belastungen kann der Fixieransatz 24 eine unterschiedliche Länge l und Dicke a aufweisen. Bei geringen axialen Belastungen kann die Länge 1,02 mm und bei größeren Belastungen beispielsweise 14 mm betragen. Die Dicke a kann bei geringen Belastungen 0,2 mm und bei größeren Belastungen 2 mm betragen. Um Störeinflüsse bei einem größer werdenden Fixieransatz 24 auf die Projektilausbildung zu vermeiden, ist eine in der Fig. 3 dargestellte Sollbruchstelle 32, 34 für eine definierte Abtrennung eines im axialen Bewegungsbereich der Einlage 12 befindlichen Teilvolumens des Befestigungsringes 10 vorgesehen. Die Sollbruchstelle 32 ist als umlaufende Nute ausgebildet und kann einen dem maximalen Einlagen-durchmesser d entsprechenden Durchmesser aufweisen sowie der Einlage 12 axial gegenüberliegend am Fixieransatz 24 angeordnet sein.

Alternativ kann die Sollbruchstelle 34 als umlaufende Ringnute an dem Übergang von der axialen Seitenfläche 26,1 zur radialen Grundfläche 26,2 des Hohlzylinders 22 angeordnet sein.

Die Fig. 4 zeigt, daß sich der Befestigungsring 10 zusätzlich zu den vorbeschriebenen Einwirkungen auch unter der Drallinwirkung des Gefechtskopfes 18 in radialer Richtung 56 von der Gefechtskopfhülle 16 lösen kann. Dazu besteht der Befestigungsring 10 aus wenigstens zwei einen gleichen Umfangswinkel aufweisenden Befestigungsring-Teilsegmenten 38, die solange von einer nicht dargestellten Sicherung zusammengehalten werden können, bis die Trennung durch Drallabbau eingeleitet wird. Im dargestellten Ausführungsbeispiel sind drei Teilsegmente 38 dargestellt, die radial gerichtete

Berührungsflächen 40 und eine Ausnehmung 42 zum störungsfreien Loslösen nach außen gegenüber einem an der Gefechtskopfhülle 16 befestigten Drallsicherungsstift 44 aufweisen.

Der Befestigungsring 10 kann aus einem von der Einlage 12 und der Gefechtskopfhülle 16 unabhängigen Werkstoff, beispielsweise aus Stahl bestehen.

#### Bezugszeichenliste

- 10 Befestigungsring
- 12 Einlage
- 14 Ladung
- 16 Hülle
- 18 Gefechtskopf
- 20 Hüllenabsatz
- 22 Hohlzylinder
- 24 Fixieransatz
- 26 Begrenzungsfäche
- 26,1 Seitenfläche 26,2 Grundfläche
- 28,30 Verbindungsmittel
- 32,34 Sollbruchstelle
- 36 axiale Richtung
- 38 Teilsegment
- 40 Berührungsfläche
- 42 Ausnehmung
- 44 Drallsicherungsstift
- 46 Projektil
- 48 Projektil
- 50 Bruchstücke
- 52 Zünd- und Übertragungseinheit
- 54 Hohlzylinderansatz
- 56 Richtung
- d = Durchmesser
- l = Länge
- a = Dicke

#### Patentansprüche

1. Befestigungsring (10) zur axialen Fixierung der Einlage (12) einer Ladung (14) an der Hülle (16) eines Gefechtskopfes (18), wobei die Einlage (12) vorderseitig durch den Befestigungsring (10) fixiert wird, dadurch gekennzeichnet, daß der Befestigungsring (10) einen um einen äußeren Hüllenabsatz (20) gestülpten Hohlzylinder (22) und einen vor einer projektilbildenden Einlage (12) radial nach innen weisenden Fixieransatz (24) sowie unter dem Detonationsdruck wirksam werdende Mittel (28, 30, 32, 34, 40) zum außenseitigen Loslösen des Befestigungsringes (10) von der Gefechtskopfhülle (16) oder zum Abtrennen des Fixieransatzes (24) vom Befestigungsring (10) enthält.
2. Befestigungsring nach Anspruch 1, dadurch gekennzeichnet, daß die Begrenzungsfächen (26) des Hohlzylinders (22) und des Hüllenabsatzes (20) durch Verbindungsmittel (28, 30) verbunden sind, die unter der Detonationswirkung eine Trennung des Befestigungsringes (10) von der Gefechtskopfhülle (16) gestatten.
3. Befestigungsring nach Anspruch 1 oder 2, gekennzeichnet durch eine Sollbruchstelle (32, 34) für eine definierte Abtrennung eines im axialen Bewegungsbereich der Einlage (12) befindlichen Teilvolumens des Befestigungsringes (10).
4. Befestigungsring nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß die Sollbruchstelle (32) als umlaufende Nute ausgebildet ist, die einen

dem maximalen Einlagenaußendurchmesser (d) entsprechenden Durchmesser aufweist und der Einlage (12) axial gegenüberliegend am Fixiersatz (24) angeordnet ist.

5. Befestigungsring nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß die Sollbruchstelle (34) als umlaufende Ringnute an dem Übergang von der axialen Seitenfläche (26.1) zur radialen Grundfläche (26.2) des Hohlzylinders (22) angeordnet ist.

6. Befestigungsring nach einem der Ansprüche 1 bis 5, gekennzeichnet durch wenigstens zwei einen gleichen Umfangswinkel aufweisende Befestigungsring-Teilsegmente (38).

7. Befestigungsring nach Anspruch 7, dadurch gekennzeichnet, daß die Teilsegmente (38) radial gerichtete Berührungsflächen (40) und eine Ausnehmung (42) zum störungsfreien Lösen nach außen gegenüber einem an der Gefechtskopfhülle (16) befestigten Drallsicherungsstift (44) aufweisen.

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Hierzu 2 Seite(n) Zeichnungen

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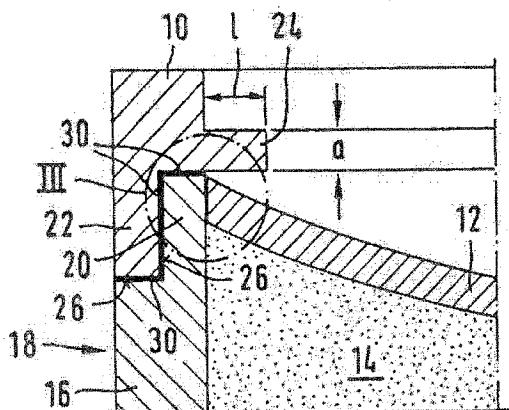


FIG.1

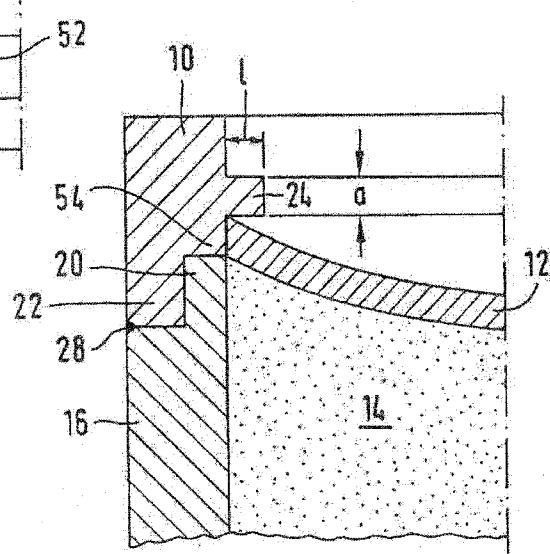
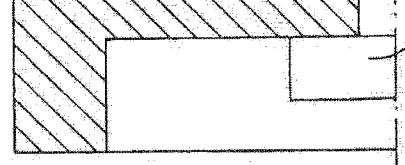


FIG.2

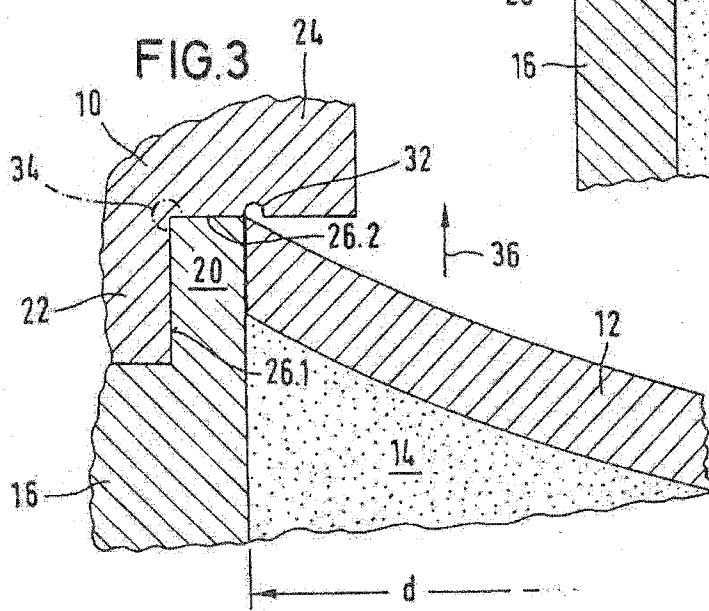


FIG.4

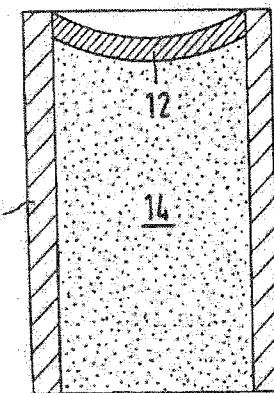
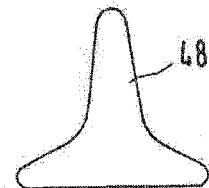
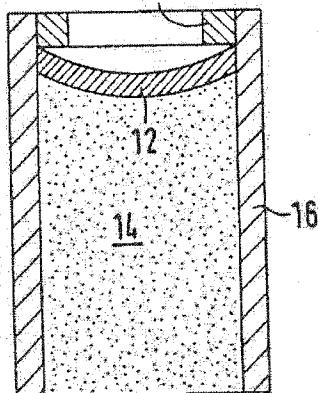
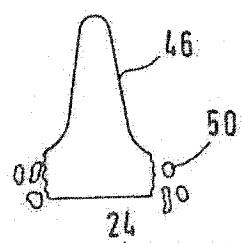
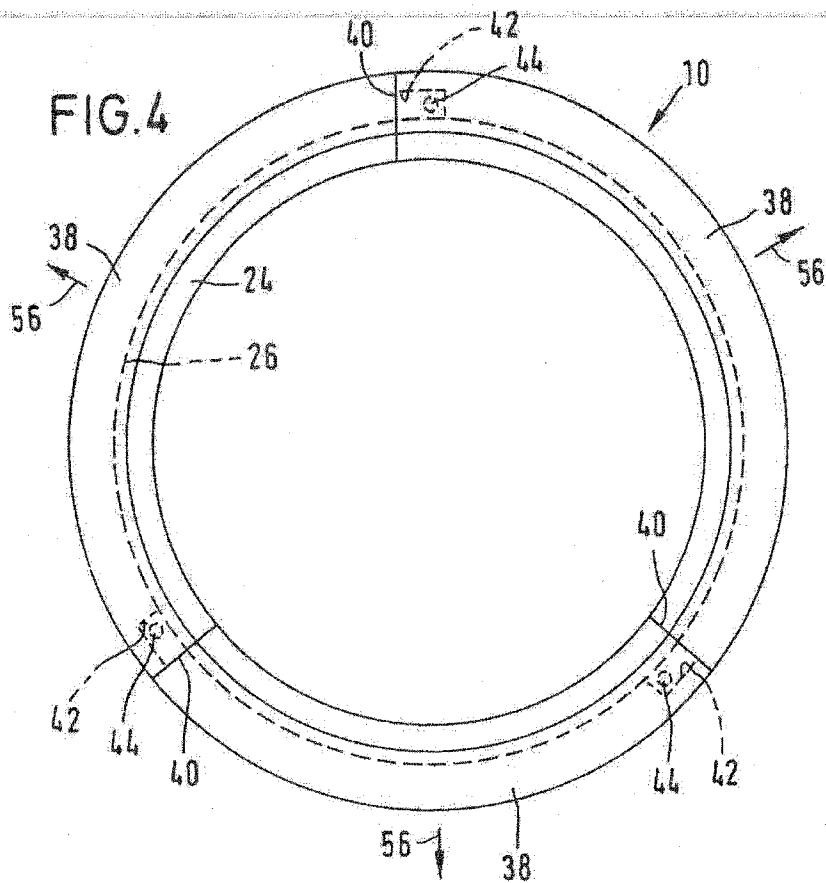


FIG.5

FIG.6